EVOLUTION OF PLANT COVER AND CARBON STOCK IN THE FUELWOOD SUPPLY BASIN OF KINSHASA (D. R. of CONGO)

Gond V., Dubiez E., Boulogne M., Pennec A., Peltier R.

CIRAD, Forest Ecosystems Goods and Services, UR BSEF, Montpellier, France

CONTEXT

* Kinshasa, a town of 8 million inhabitants needs 490 000 T of charcoal and 60 000 T of fuel wood per year, representing 4,8 million m^3 of wood.

- The city is surrounded by wooded savannah interspersed with gallery forests which are becoming degraded,

OBJECTIVES

The European Makala project objectives were to map forest resources of the fuel wood supply basin of Kinshasa (fig. 1) to predict its evolution and to propose solutions against degradation.

The analysis of past land cover change, used satellite imaging techniques to understand and document the spatial organization, mechanisms of forest degradation and the mechanisms for the recovery of forest stands.

MATERIAL and METHODS

Fig. 1

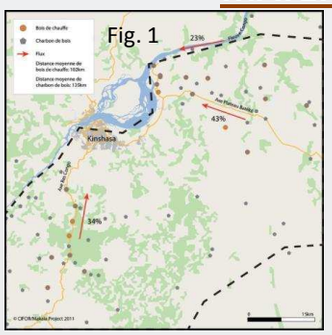
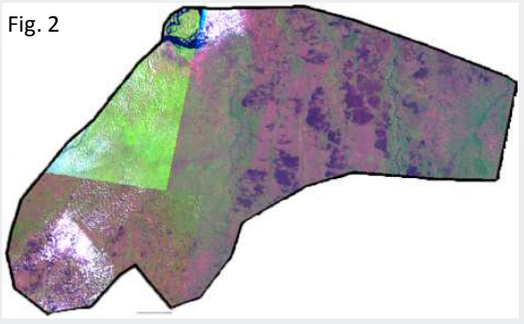


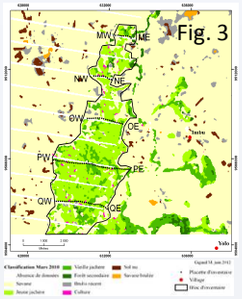
Fig. 2



Four periods have been use to map (1984, 2001, 2006 and 2012) with a mosaic of 4 LANDSAT images (fig. 2). Classification identified four land cover types (Forest, Old fallow, Young fallow and Savannahs including agriculture, burnt and bare surfaces).

Field work consisted in measuring 5 main tree species (*Albizia adianthifolia, Hymenocardia ulmoïdes, Markhamia tomentosa, Oncoba welwitschii, Pentaclethra eetveldeana)* and a group of secondary species. A total of 4337 trees on 317 plots (20m radius) were measured along transects (fig. 3).

Fig. 3



* Heights and dbh of 30 trees by species were measured.

* Lengths and circum large and fine (13 cm) were measured.

* Surfaces inventoried: Forest 0.37ha (0.18%), Old fallow 0.78ha (0.08%) Young fallow 1.57ha (0.06%) and Savannah 1.34ha (0.08%).

RESULTS

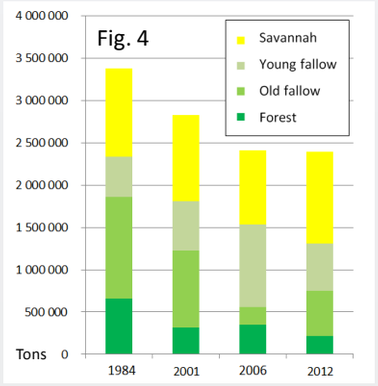
* Tree volume was calculated (Smalian equation) $V = \frac{1}{4\pi}\left(\frac{C_1^2 + C_2^2}{2}\right)L$

* Using the GWD Database, mean wood density is 0.546 T/ha

* AGB is: Forest 75 T/ha, Old fallow 33 T/ha, Young fallow 6 T/ha and Savannah 3 T/ha

* Carbon stock is: Forest 38 T/ha, Old fallow 17 T/ha, Young fallow 3 T/ha and Savannah 1.5 T/ha

Fig. 4



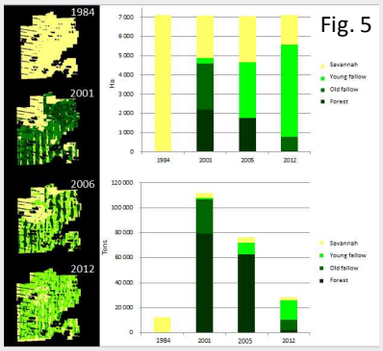
* Carbon stock (tons) dynamic within the fuel wood supply basin of Kinshasa shows a 30% of loss on a period of 28 years (-1% per year in average).

DISCUSSION

* Locally it can play a key role in management (Fig. 5).

* All players in the fuel wood economy have to be supported to improve the supply effectiveness (tree planting, transport, distribution).

Fig. 5



Marien, J.-N., Dubiez, E., Louppe, D., Larzillière, A., (Eds), Quand la ville mange la forêt, les défis du bois-énergie en Afrique centrale, Quae editions, 238 pages. ISBN : 978-2-7592-1980-3.

Makala project thanks the EC financial support (EuropeAid DCI-ENV 2008-151-384).

http://makala.cirad.fr